

**Claims:**

1. An apparatus for sensing a potential rollover situation involving a vehicle, comprising:  
an inertial reference unit including three accelerometers and three gyroscopes which provide data on vehicle motion;

5 vehicle control devices arranged to affect control of the vehicle; and  
a processor coupled to said inertial reference unit and said vehicle control devices and including an algorithm arranged to receive data from said inertial reference unit and control said vehicle control devices to apply the throttle, brakes and steering to prevent the rollover.

10 2. The apparatus of claim 1, further comprising location determining means for determining the location of the vehicle on a roadway, said processor being coupled to said location determining means and being arranged to consider the location of the vehicle when determining at least one of the existence of a potential rollover situation and the manner in which to control said vehicle control devices.

15 3. The apparatus of claim 1, further comprising a Kalman filter coupled to said processor for optimizing the data on vehicle motion from said inertial reference unit.

4. The apparatus of claim 1, further comprising a navigation system coupled to said processor and arranged to provide information about a roadway on which the vehicle is traveling from a map database to said  
20 processor, said processor being arranged to process the data on vehicle motion and the roadway information and control a warning system to provide a warning to the driver upon detection of the potential rollover situation.

5. The apparatus of claim 1, wherein a first one of said accelerometers is arranged to sense vehicle acceleration in a latitude direction, a second one of said accelerometers is arranged to sense vehicle acceleration in a  
25 longitudinal direction and a third one of said accelerometers is arranged to sense vehicle acceleration in a vertical direction.

6. The apparatus of claim 1, wherein a first one of said gyroscopes is arranged to sense angular rate about the pitch axis, a second one of said gyroscopes is arranged to sense angular rate about the yaw axis and a third  
30 one of said gyroscopes is arranged to sense angular rate about the roll axis.